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**STOP BAND LASER APPARATUS AND METHOD**

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**ABSTRACT**

Band gap lasers based upon activated periodic one-dimensional  
5 structures are disclosed. The periodic structures may be cholesteric liquid  
crystals, other chiral materials, or materials with alternating dielectric layers with  
different indices of refraction. The amplifying component may be an organic dye,  
rare earth or other ion, conjugated polymer, or other luminescent materials.  
Lasing occurs at a predetermined frequency corresponding to that of modes at  
10 the edge of the stop band in these periodic structures or to the frequency of a  
defect mode introduced into the structure. The lasing threshold may be lowered  
and the efficiency raised by the following further considerations: Adjacent layers  
of different period, and correspondingly different stop band, are incorporated into  
the structure to serve as reflectors on either or both sides of the active medium.  
15 The peak emission of the active medium is chosen to be close to the frequency  
of one of the long-lived photon modes of the system.